Resource Summary: Physics 232

I. Objective

To summarize the resources and materials used to teach Physics 232, Computational Methods of Physics, taught by Anand Shastri and Andrew Green during the Spring semester of 1996.

II. Course Philosophy and Format

The philosophy of Physics 232, Spring 1996 was to present physics majors to software packages and programming skills that might be of use to their future work in academics, research, or industry. Because the course is for one credit, the exercises were planned with the intent that the average student should be able to finish all the work within a total of three hours per week. The class met from 2-5 p.m. Friday afternoons. The class of 17 students divided itself between Physics B54 (221 Help Room) and Physics 83 (222 Help Room) when the exercises required the use of Gateway Pentium computers (because there were two instructors, simultaneous use of the two rooms was not a problem). The class met in either Durham 248 or Industrial Education II 124 if the work required the use of Project Vincent workstations.

Students were given a handout at the beginning of class (see Appendix for handouts used) containing exercises to perform, and were usually instructed to turn in their work by the following Wednesday. Lecturing was minimal. Demonstrations were occasionally performed to show students how to use software packages.

The numerical algorithms covered included those for differentiation, integration, as well as for solving systems of coupled first order differential equations. Second order differential equations were also discussed in the context of the wave equation. Software packages included Microsoft Excel, Maple Version V, Netscape, and Microsoft Word. Software were used either on the Gateway Pentium machines or on Project Vincent workstations, depending on availability. Some elementary inferfacing projects were explored using Quick Basic and LabVIEW.

III. Physics 232 Locker and Newsgroup

Preparation	Purpose	Contact Person
creation of Physics 232 newsgroup	for posting information regarding meeting times	Durham Center, W. J. Hauber (wjhauber@iastate.edu)
creation of Physics 232 locker	for posting data files and program files for use by students during and assignment	Physics Department Computer Manager, Matt Hosch (hosch@iastate.edu)

IV. Where to Reserve Classrooms of Vincent Workstations

Classroom Location	Person to Contact	Note
248 Durham Center	Secretary in Durham 192	May only be reserved a total of 4 hours for the entire semester
124 Industrial Education 2	Mike (4-2588)	Unlimited reservations

V. References (By Topic)

A. Numerical Methods, Spreadsheets

Resource	Location	Comments
Numerical Recipes (FORTRAN)	http://cfatab.harvard.edu/nr/bookfpdf.html	The complete text online! Very handy to know about.
Computational Physics, S. E. Koonin	ISU Parks Library	A very useful book, but slightly more advanced than a sophomore level course.
Excel for Science and Technology	Physics Main Office	Text was moderately helpful, but rather lacking in solid physics applications

B. Symbolic Solvers

Resource	Location	Comments
Classical Mechanics with Maple	Physics Main Office	Extremely useful. A good presentation of the basics needed to use the symbolic solver Maple.
Programming with Mathematica	Physics Main Office	Never used this book, because we decided to use Maple rather than Mathematica.

C. Computer Interfacing

Resource	Location	Comments
LabVIEW Demonstration Book with diskette (15 copies)	Linda Office/Workroom	Extremely useful introduction to this pictorial programming language.
Dr. Stefan Zollner	A300	Gave useful information regarding GPIB boards and provided the opportunity for the class to visit his lab (just be sure to knock before you enter).

D. Atanasoff-Berry Computer

Dr. Lester Earls	Very helpful. Gave useful information about J.V. Atanasoff
Dr. John Gustafson	Very helpful. Gave information about the Atanasoff-Berry Computer. Potential guest speaker.

VI. Course Handouts